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WHAT IS CLAIMED IS:

- 1. A method comprising the steps of:
 - (a) suspending a quantity of functionalized carbon nanotubes in a solvent to form a suspension of functionalized carbon nanotubes; and
 - (b) heating said suspension to a temperature that will thermally defunctionalize the functionalized carbon nanotubes yielding a defunctionalized product.
- 2. The method of Claim 1, wherein the carbon nanotubes are selected from the group consisting of single-wall carbon nanotubes (SWNTs), multi-wall carbon nanotubes (MWNTs), double-wall carbon nanotubes, semiconducting carbon nanotubes, metallic carbon nanotubes, semi-metallic carbon nanotubes, chiral carbon nanotubes, buckytubes, carbon fibrils, and combinations thereof.
- 3. The method of Claim 1 or 2, wherein the solvent is thermally stable at the temperatures required for defunctionalization.
- 4. The method of Claims 1-2, or 3, wherein the solvent is selected from the group consisting of o-dichlorobenzene, benzene, toluene, water, sulfuric acid, oleum, sulfuric acid with dissolved potassium persulfate, liquid ammonia, liquid ammonia with dissolved alkali metals, alkanes, parafins, thiophene, and combinations thereof.
- 5. The method of Claims 1-3, or 4, wherein the suspension is completely enclosed in a vessel.
- 6. The method of Claims 1-4, or 5, wherein the suspension further comprises a polymeric species.
- 7. The method of Claims 1-5, or 6, wherein the suspension further comprises a surfactant.
- 8. The method of Claims 1-6, or 7, wherein the defunctionalized product is selected from the group consisting of unfunctionalized carbon nanotubes, partially functionalized carbon nanotubes, and combinations thereof.

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9. The method of Claims 1-7, or 8, wherein the defunctionalized product is functionally uniform.

- 10. The method of Claims 1-8, or 9, wherein the defunctionalized product is resuspendable in a solvent.
- 11. The method of Claims 1-9, or 10, wherein the functionalized carbon nanotubes are selectively defunctionalized according to different (n,m) types, said types displaying differential propensity for defunctionalization.
- 12. A method comprising the steps of:
 - (a) dispersing a quantity of functionalized carbon nanotubes in a polymer matrix to form a first blended material comprising functionalized carbon nanotubes in a polymer host; and
 - (b) heating said first blended material to a temperature that will thermally defunctionalize the functionalized carbon nanotubes with the polymer host to yield a second blended material comprising defunctionalized or partially defunctionalized carbon nanotubes in a polymer host.
- 13. The method of Claim 12, wherein the carbon nanotubes are selected from the group consisting of single-wall carbon nanotubes (SWNTs), multi-wall carbon nanotubes (MWNTs), double-wall carbon nanotubes, semiconducting carbon nanotubes, metallic carbon nanotubes, semi-metallic carbon nanotubes, chiral carbon nanotubes, buckytubes, carbon fibrils, and combinations thereof
- 14. The method of Claim 12 or 13, wherein the defunctionalized carbon nanotubes are selected from the group consisting of unfunctionalized carbon nanotubes, partially functionalized carbon nanotubes, and combinations thereof.